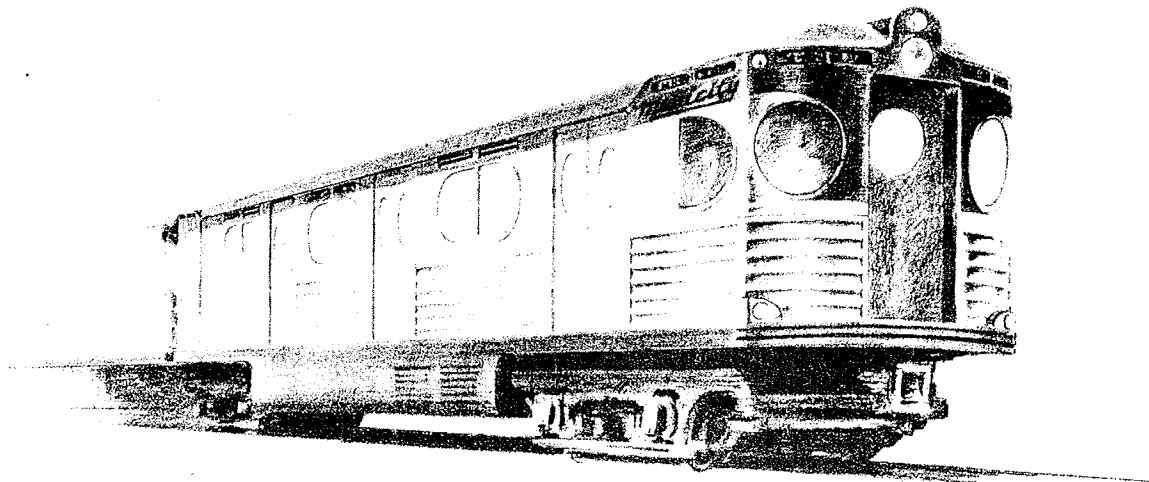


LONG RANGE RAPID TRANSIT PROGRAM FOR SAN FRANCISCO

By S. H. BINGHAM

FEBRUARY

1949



BOARD OF TRANSPORTATION
OF
THE CITY OF NEW YORK
250 Hudson Street
New York 13, N. Y.

February 1, 1949

Hon. Elmer E. Robinson
Mayor of San Francisco
2101 Pacific Avenue
San Francisco, California

Dear Mayor Robinson:

Transmitted herewith is a report containing a long-range rapid transit program for San Francisco.

After careful analysis and consideration, the writer believes that a subway system is the best solution to the city's mass transportation problems. Accordingly, this report has been devoted principally to the problems of the construction and equipment of such a railroad. Highway construction, traffic regulation and other similar controls of surface traffic are not properly part of this report and have not been discussed in any detail. As a matter of fact, transferring the daily passenger travel of the city in large part to a subway system will make other traffic problems that much easier to solve.

This report has been built up on the following general basis. There is first a discussion of general principles upon which the writer feels every approach to transit planning must be based. Even though it may seem a platitude, it is a matter of hard, practical experience that it is the interests of the community as a whole, the needs of the daily riders, which must predominate, rather than the interests and the desires of limited special groups.

There then follows, a general discussion of the development of traffic problems and the considerations of convenience, efficiency, economy and optimum community growth which prove that a subway system is the best solution.

Hon. Elmer E. Robinson, Mayor

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Finally, the subway system itself is described. In this section there are proposed routings and many suggestions concerning the best methods of designing stations, equipment, repair facilities and other features based upon work and experience all over the world. The primary considerations determining the details of the proposal were, as indicated above, the interests of the city as a whole, efficient, economical construction and operation, and maximization of revenues.

The writer believes that you will find this program to be of value and to be based upon the same principles of progressive city government that your administration espouses.

It has indeed been a great privilege to be associated with you and I sincerely trust that this report will meet with your approval and that of the people of San Francisco.

Respectfully yours,

(signed) S. H. Bingham

S. H. Bingham
Commissioner

PROPOSED SUBWAY ROUTES

In order to provide a subway rapid transit system that fits the existing pattern of passenger traffic flow, conforms with residential and business development, and can be expanded to meet future demands and stimulate future growth, three subway lines are proposed leading into Market Street. The location of Market Street in the street pattern and its importance in the business and commercial life of the city make its selection as the trunk line of a subway inevitable. These lines are shown on the accompanying strip maps. Briefly described, the lines are:

Market-Twin Peaks Line, a two-track line from the Merced Park area, through the Twin-Peaks Tunnel and under Market and Montgomery Streets.

Market-Mission Line - a two-track line from Valencia Street, under Mission, Market and 2nd Streets.

O'Farrell-Geary Line - a two-track line from Park Presidio Boulevard, under Geary, O'Farrell, Market and Montgomery Streets.

These lines will operate on four tracks under Market Street from Van Ness to Montgomery, and two tracks elsewhere. The four tracks under Market Street are justified to provide the capacity for frequent service on the Twin Peaks and Mission Lines, and to make possible future

expansion with the least expense and delay, and no further interference with street traffic by heavy construction.

Market Street - Twin Peaks Tunnel Line

It is recommended that the construction of this line be undertaken first. Its completion will provide the quickest and most effective means of funneling the large passenger traffic through the downtown commercial center. Besides providing a means of rapid travel for the daily passenger this route will make the journey to and from Merced Park and seashore points faster and more convenient. Future extension of this line along Columbus Avenue will provide similar service for residential areas along that street.

The westerly end of this line is brought out of Twin Peaks Tunnel as shown on the strip maps in order to avoid an elevated structure at St. Francis Circle made necessary by the topography if the subway were extended under West Portal Avenue. The elevated type of structure could readily be used if studies indicate that the West Portal Avenue route is the more desirable. In either case the construction should allow operation of trolley cars through the tunnel up to the time the subway is opened for operation.

Market-Mission Line

The Market-Mission Line is to serve the large Mission area and as the heart of a route that in the future can be extended both east and west to form a rapid transit line extending from cities across the Bay to Daly City and beyond.

Because of the ground elevations beyond Valencia St., detailed study will be required to determine the exact point of entry onto the old Southern Pacific right-of-way and the type of construction to be used.

O'Farrell-Geary Line

Construction of this line from O'Farrell and Market to Park Presidio Boulevard will serve the Richmond district and permit a connection with suburban buses from Marin County. Future extension can give speedy travel to Sutro Heights and other shore points. The choice of O'Farrell Street at the eastern end of this line rather than Geary was to permit easier access to the important station at 3rd and Market Streets where passengers can change to trains on any line. It may be possible to construct this line entirely on Geary Street; however, it is believed that this would increase the construction costs. Final determination can be made after detailed engineering studies.

ENGINEERING AND CONSTRUCTION

In order to provide for the development of this system in an orderly manner and not to place too great a financial burden on the city at any one time it is recommended that the construction be done in four phases. The basic engineering work should be well under way for the entire system by the time construction starts. This will keep costs down, reduce delays and assure sufficient overlapping of the construction of the phases to keep the project running smoothly.

These proposals for construction cannot go deeply into details of design. Complete engineering study is an essential prerequisite before designs can be prepared. However, the proposals are based on the most modern construction and operating practices available. Every effort should be made to keep total cost at a minimum. Operating as well as construction costs should always be studied because in many cases a higher initial cost can be justified by later savings in operating expenses.

Insofar as possible construction should be done by the cut-and-cover method, since this is ordinarily somewhat cheaper than tunneling. Several sections will have to be done by tunneling, particularly where the subway goes under hills, but these are kept at a minimum. The cut-and-cover procedure is to open up the street, then to cover the excavation with a roadway made of heavy planks over which street traffic can proceed in the normal fashion. Construction of the subway then goes on underneath.

All alterations to sub-surface structures, such as gas and water mains, electric power and telephone lines, and sewers should be made while the street is opened for subway construction. This is an excellent opportunity for the city to modernize these essential structures, and private utility companies who take advantage of the same opportunity may meet some of the costs.

Provision should be made in the subway structure for duct chambers to carry utility lines of various kinds. Some revenues can be obtained from the rental of such facilities to the utility companies.

The accompanying map and overlays illustrate the phases of the construction.

**PROPOSED SUBWAY SYSTEM
FOR SAN FRANCISCO**

Prepared by
S.H. Bingham
Feb. 1949

Broken lines indicate future extension.

BAY OF SAN FRANCISCO

PHASE 1

PRESIDIO

BLANCH ST

TEAR ST

TEAR ST

TEAR ST

TEAR ST

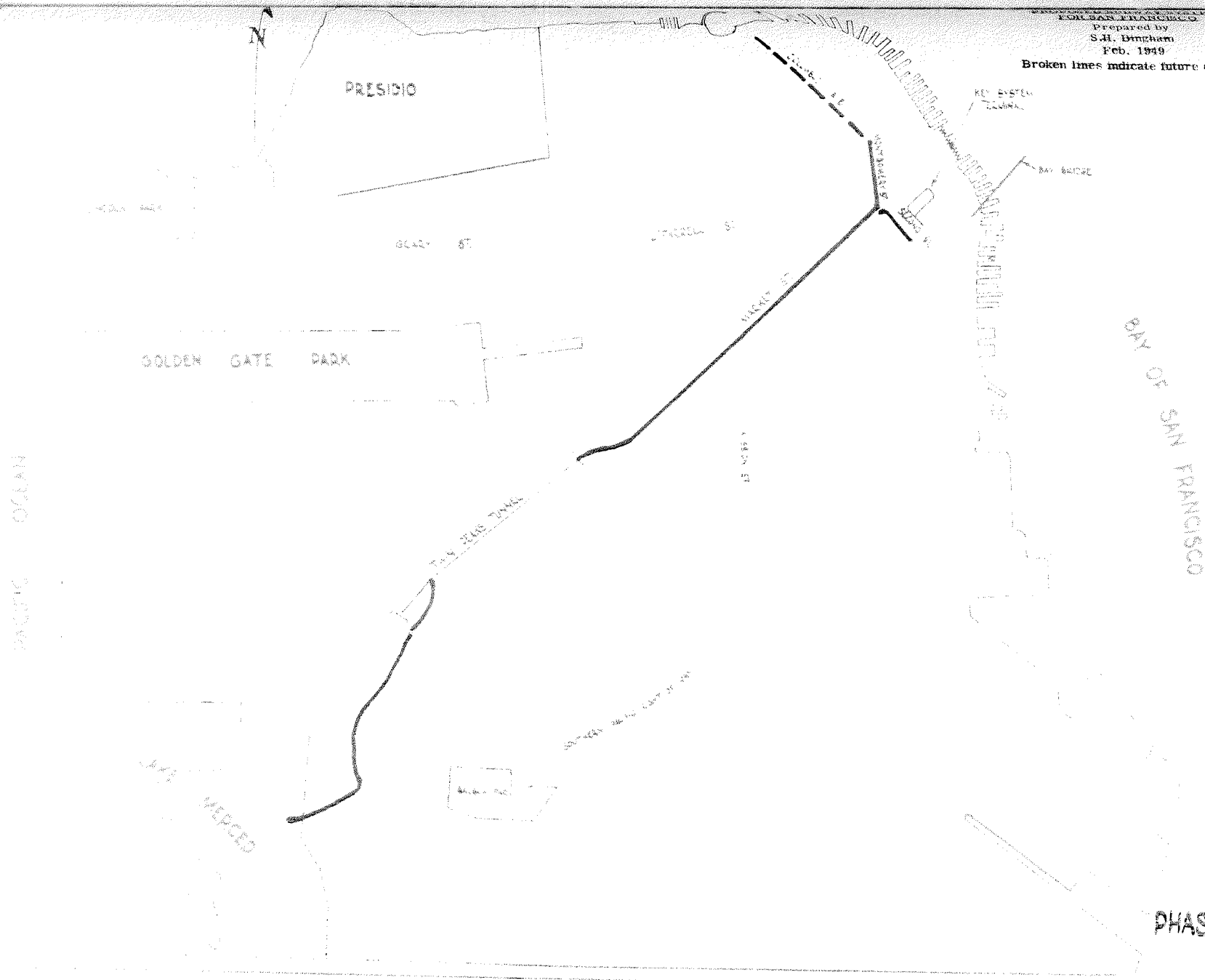
NEW SYSTEM
TERMINAL

BAY BRIDGE

BAY ST

PROPOSED SAN FRANCISCO
FOR SAN FRANCISCO
Prepared by
S.H. Bingham
Feb. 1949

Broken lines indicate future extension.



PROPOSED SUBWAY SYSTEM
FOR SAN FRANCISCO

Prepared by
S.H. Bingham
Feb. 1949

Broken lines indicate future extension.

KEY SYSTEM
TERMINAL

BAY BRIDGE

BAY OF SAN FRANCISCO

PHASE 3

GOLDEN GATE BRIDGE

PRESIDIO

GRAND ST

CLAY ST

MARKET ST

GOLDEN GATE PARK

THE SAN FRANCISCO

GOLDEN GATE LIGHT RAIL

BAYVIEW

STANDARD MAP COMPANY
FOR SAN FRANCISCO
Prepared by
S.H. Bingham
Feb. 1949

Broken lines indicate future extension.

PACIFIC OCEAN

PRESIDIO

GOLDEN GATE PARK

GLAZY ST

MARKET ST

MARKET ST

THE EMBARKMENT

LAKE MERCED

BAY OF SAN FRANCISCO

PHASE 4

KEY SYSTEM
TERMINA

BAY BRIDGE

MARKET ST

MARKET ST

MARKET ST

MARKET ST

MARKET ST

Phase 1.

Construction of the structure for all four tracks on Market Street from Third to Van Ness and all flexing arrangements west of the Third Street station is recommended in the first phase. (Flexing of tracks means the construction of connecting tracks between different lines so that no crossing of lines at the same grade occurs.) This will include development of the station structure at Third Street with a mezzanine and two track levels. The track layout of the Market-Twin Peaks Line will permit operation on the upper level at Third Street to provide easy access during initial operation of this line. The two-level track construction will facilitate the turns into Second and Montgomery Streets.

Only the two northerly tracks on Market Street to be used by the Twin-Peaks line need be equipped and finished at this time. The construction of the tunnel and structure for all four tracks at the same time will be cheaper than constructing two tracks at a time, and will involve less delay and hindrance to street traffic. This phase will also include the construction of a station for subway trains at the western end of the Twin-Peaks tunnel, and the modification of the two tunnel stations for subway trains. This can be done without interruption to the trolley service.

Phase 2.

The eastern portion of the Mission Line is to be carried down Second Street to a station opposite the Bay Bridge terminal where a foot passageway will connect with the terminal. If negotiations for operation over the bridge have been successful such a passageway will be unnecessary.

Second Street was selected as the route for a Bay Bridge connection because of the construction of the bridge approaches. A route east of Second Street to connect with the bridge would be more complicated and expensive than that proposed. This connection can best be made by approaching the existing tracks from the north and west as shown on the maps.

Future extension of a branch from Second Street to the Southern Pacific station should be considered to make it possible to remove some of the many buses now serving that terminal.

This phase will also include the extension of the subway from the western end of the Twin-Peaks tunnel to the repair shop and terminal to be constructed south of Eucalyptus Avenue.

Consideration was given to the extension of the subway farther east on Market Street, but this appeared unwarranted because of the expense of construction in the

filled ground and the changing and unsettled character of land use development east of Montgomery Street.

If it is at all financially possible Phase 2 should be constructed simultaneously with Phase 1.

At the same time an effort should be made to arrange for extended operation of San Francisco subway service across the Bay Bridge. Since present Key System cars operate on the bridge on power from a third rail, subway cars could run on the bridge. The construction of a connecting ramp from Second Street to the bridge tracks would permit operation to a terminal in Oakland and an excellent service to passengers from the East Bay Area to all points served by the Market-Twin Peaks line at this stage of the development. The connection with the Bay Bridge lines would complete an eleven-mile transit system with only the construction expense of some four miles of right-of-way.

Operation of present Key System cars in the subway would involve a very considerable increase in construction costs which is not deemed justified. These cars require a higher tunnel because of their roof structure, made necessary by their obtaining power from an overhead line in the East Bay area.

Phase 3.

This phase includes the finishing and equipping of the southerly pair of tracks on Market Street and construction of the Mission Street Line to a station in the vicinity of Valencia Street.

This will open up direct subway service to the Mission District.

Transfer from Mission to Twin-Peaks trains will be convenient at the Third Street station, where only crossing a platform will be involved.

Phase 4.

This phase is the construction of the O'Farrell-Geary Line to a station at Park Presidio Boulevard.

Transferring between any of the three lines will be readily accomplished at the Third Street station.

This line will serve the Richmond District and the developing shopping center in the vicinity of Union Square.

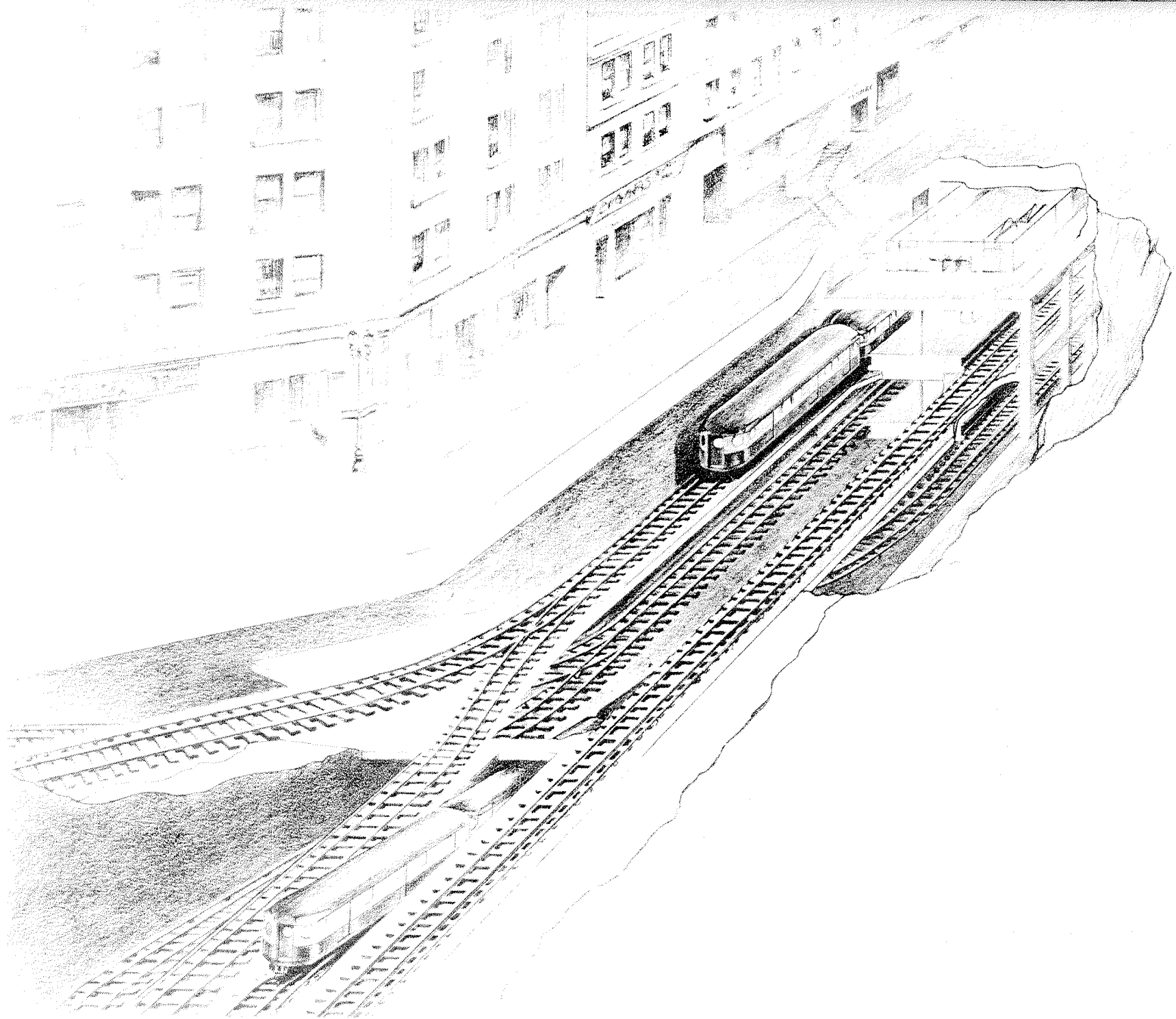
Future Extensions

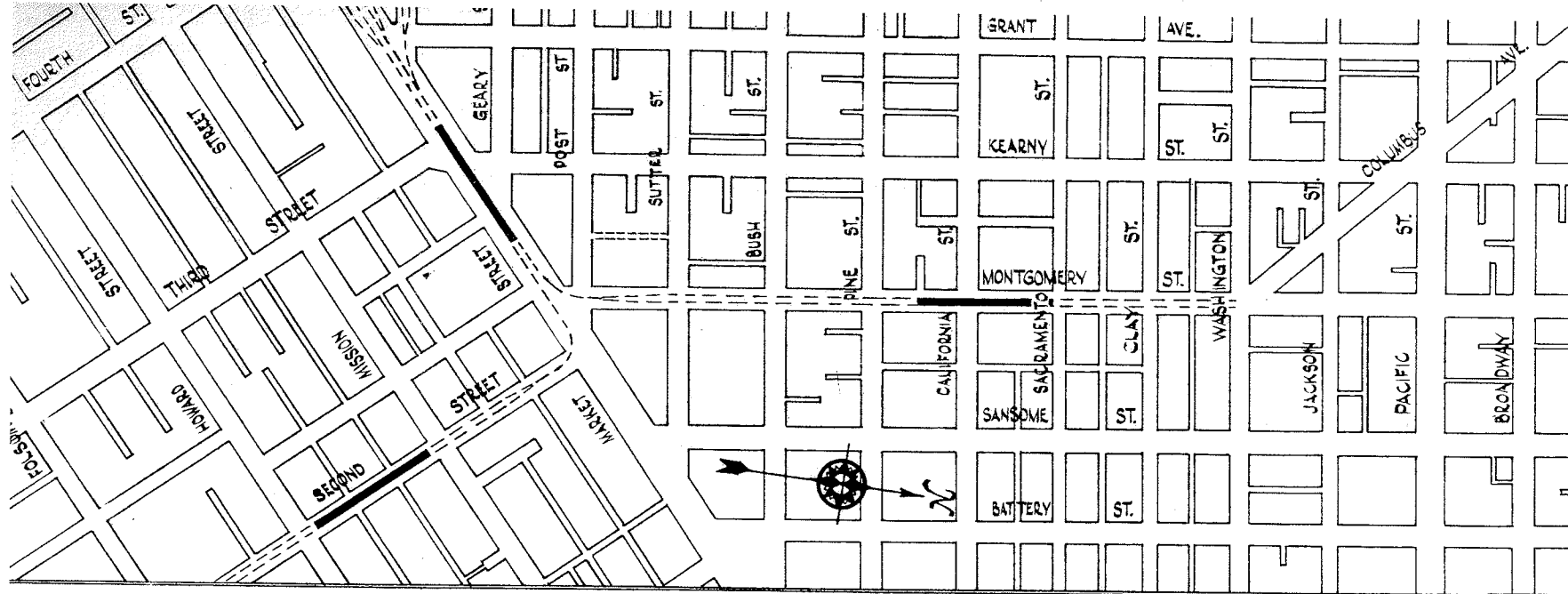
The proposed subway system will permit of extension as future needs arise and when funds are available.

In addition to the extension onto the Bay Bridge tracks as described above, extensions along Columbus Avenue; westward on Geary Boulevard to the shore; and south and west from the Mission Street Line along the old Southern Pacific right-of-way into San Mateo County

are easily possible.

It would be wise to prepare the designs and specifications for the entire system as soon as possible. A better transit system will result if planning and design are completed for the project as a whole rather than piecemeal. In addition, the existence of a complete set of engineering specifications for the project will be exceedingly valuable if there is a resumption of large scale state and federal assistance for public works projects.



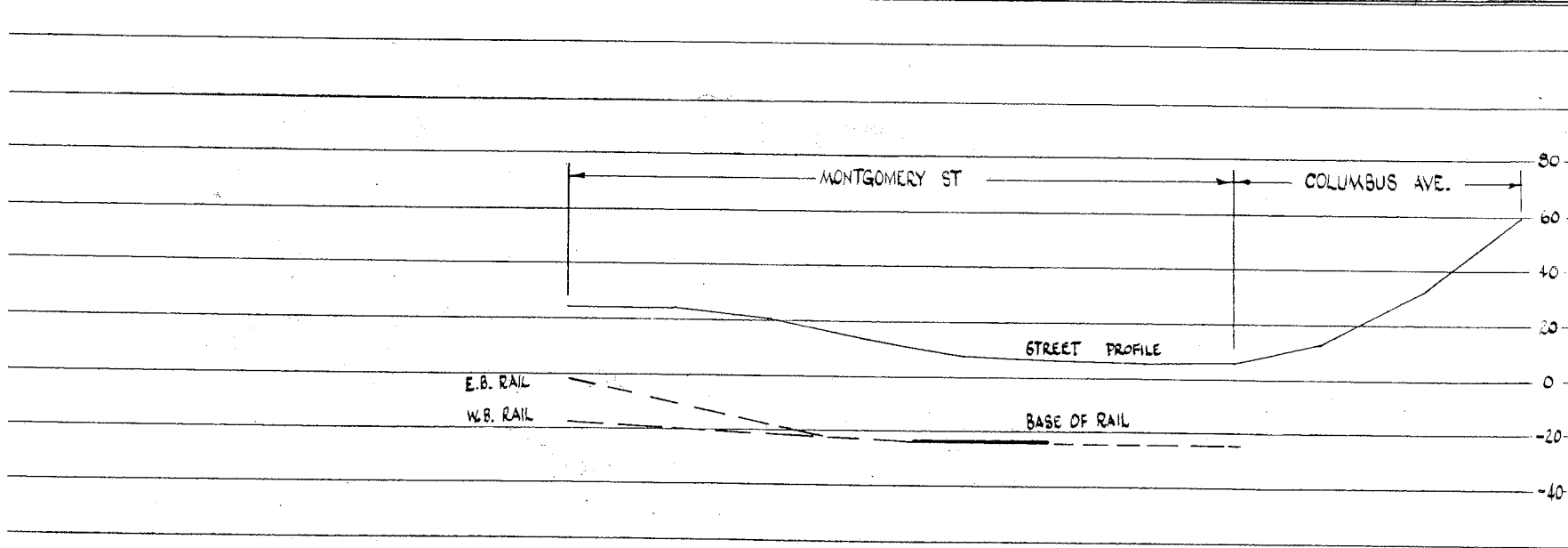


MARKET-TWIN PEAKS LINE

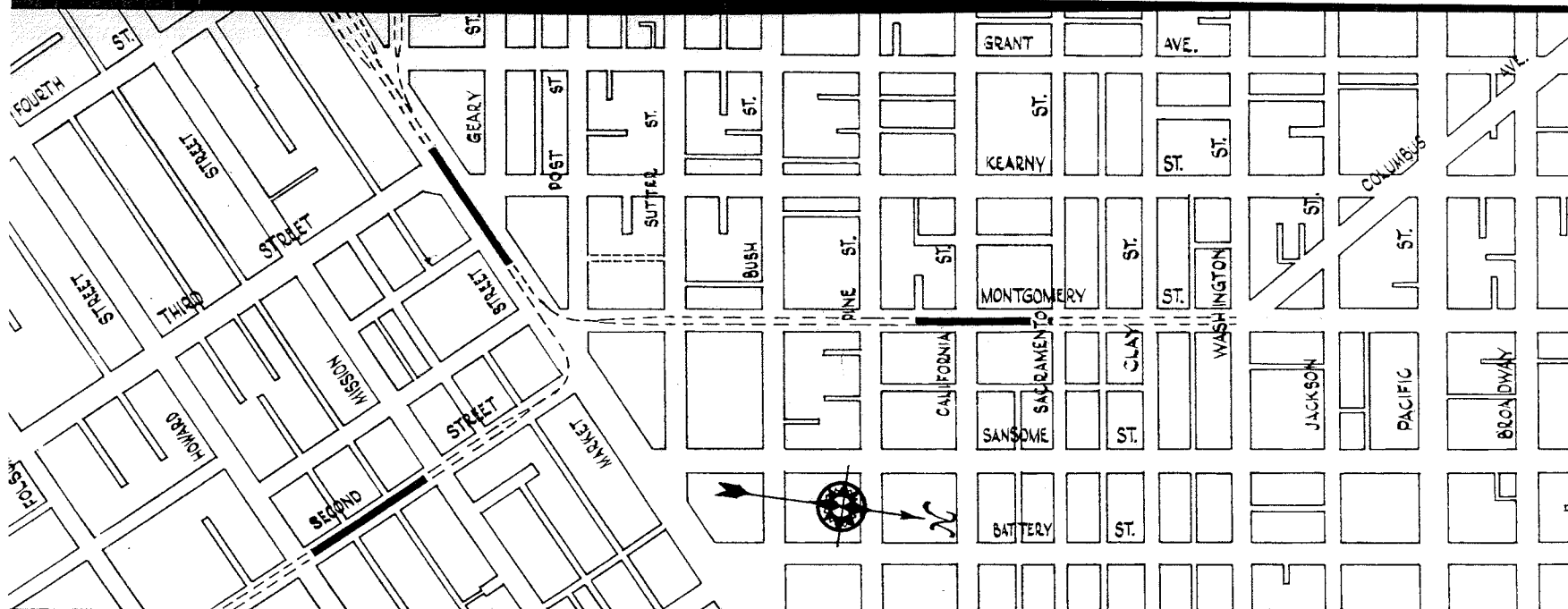
Plan and Profile

MONTGOMERY ST.

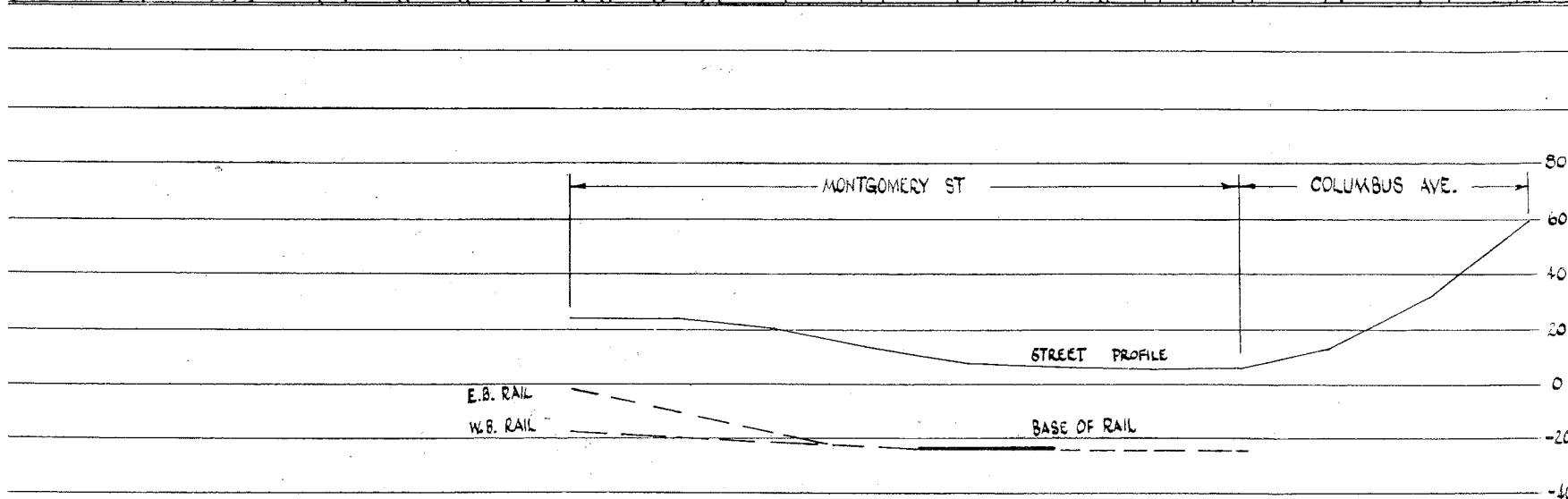
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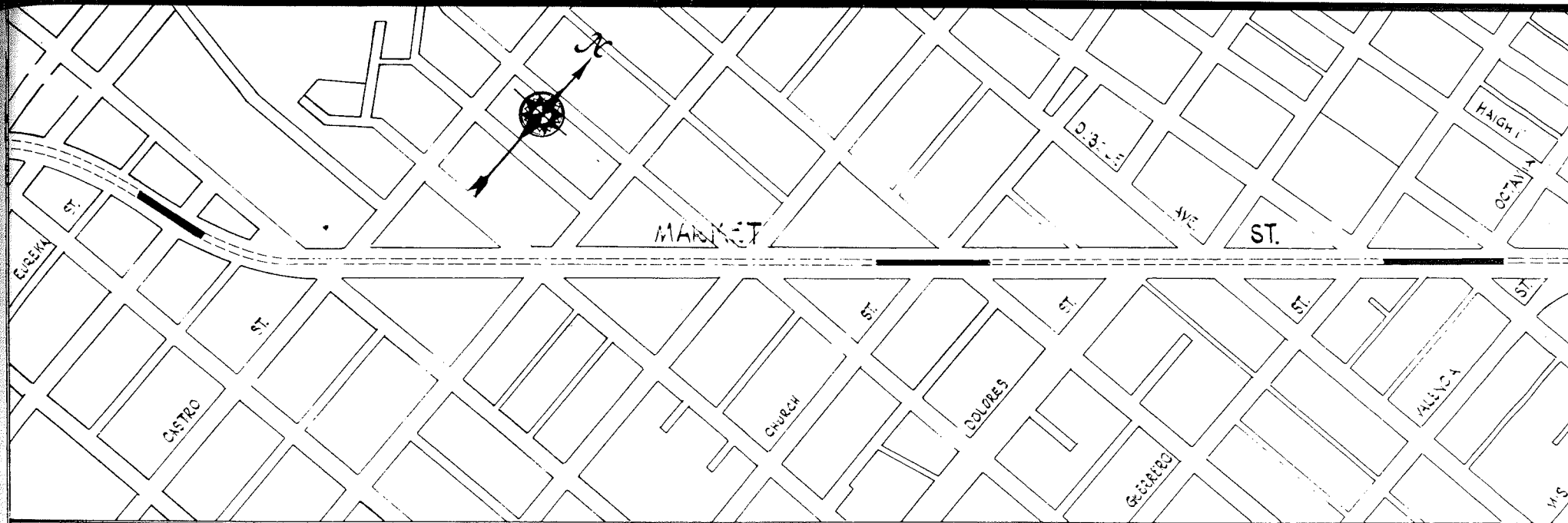
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MARKET-TWIN
PEAKS LINE
Plan and Profile
MONTGOMERY ST.
Scale 1" = 400'

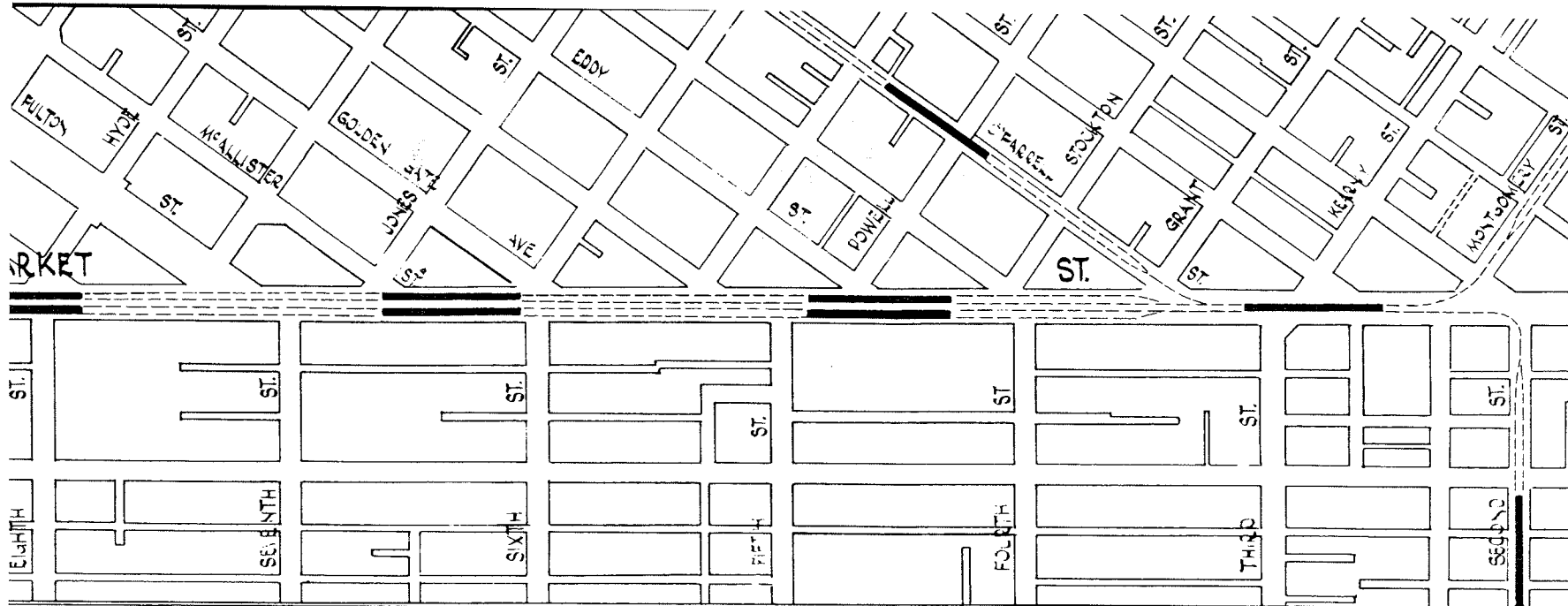


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EUREKA VALLEY STA.

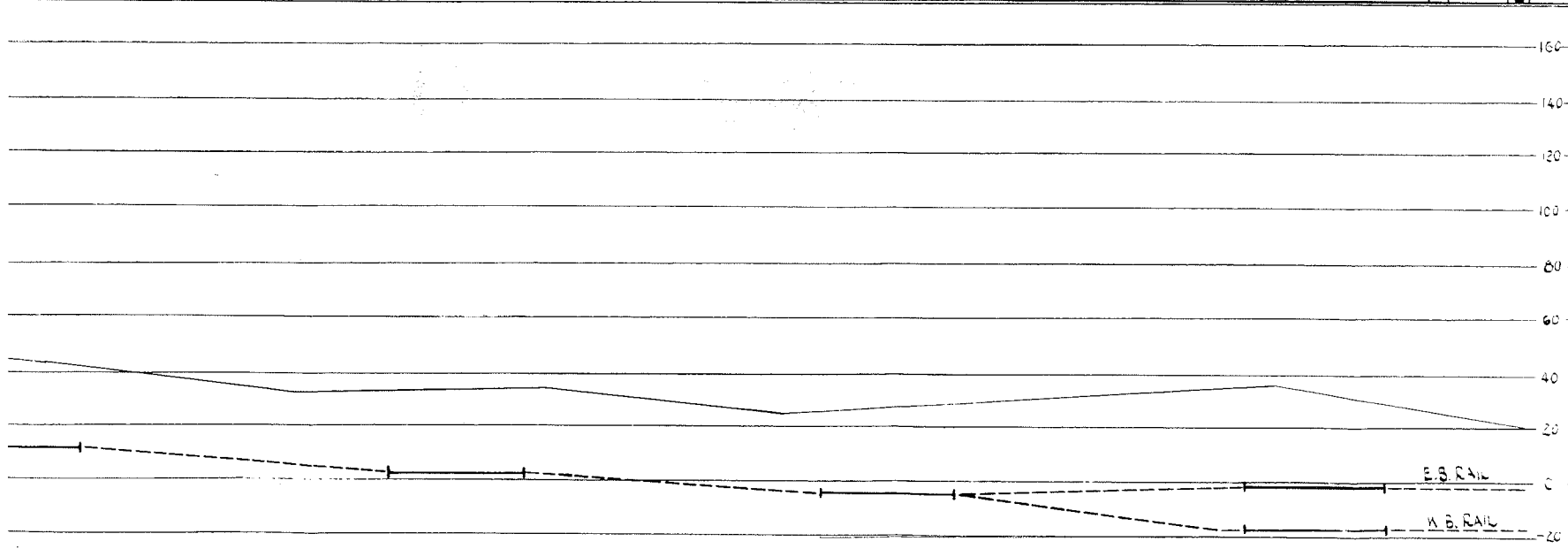
TWIN PEAKS TUNNEL



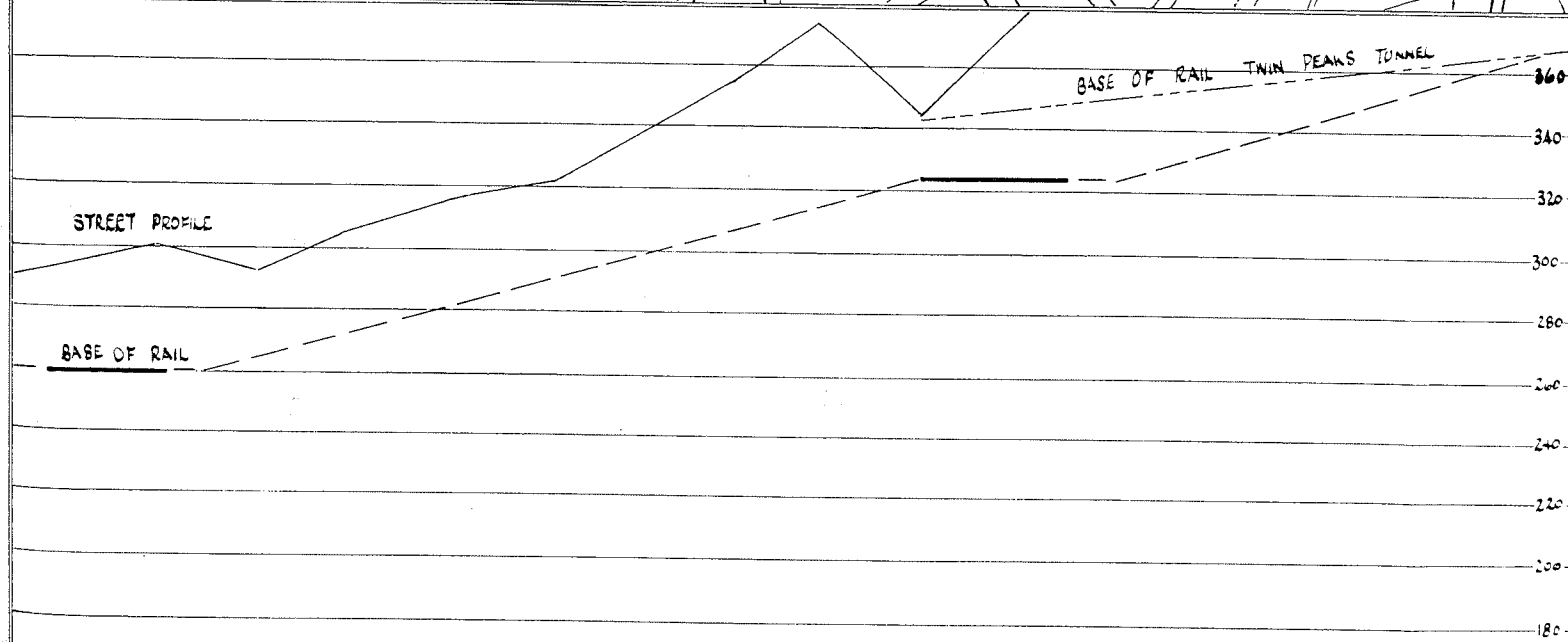
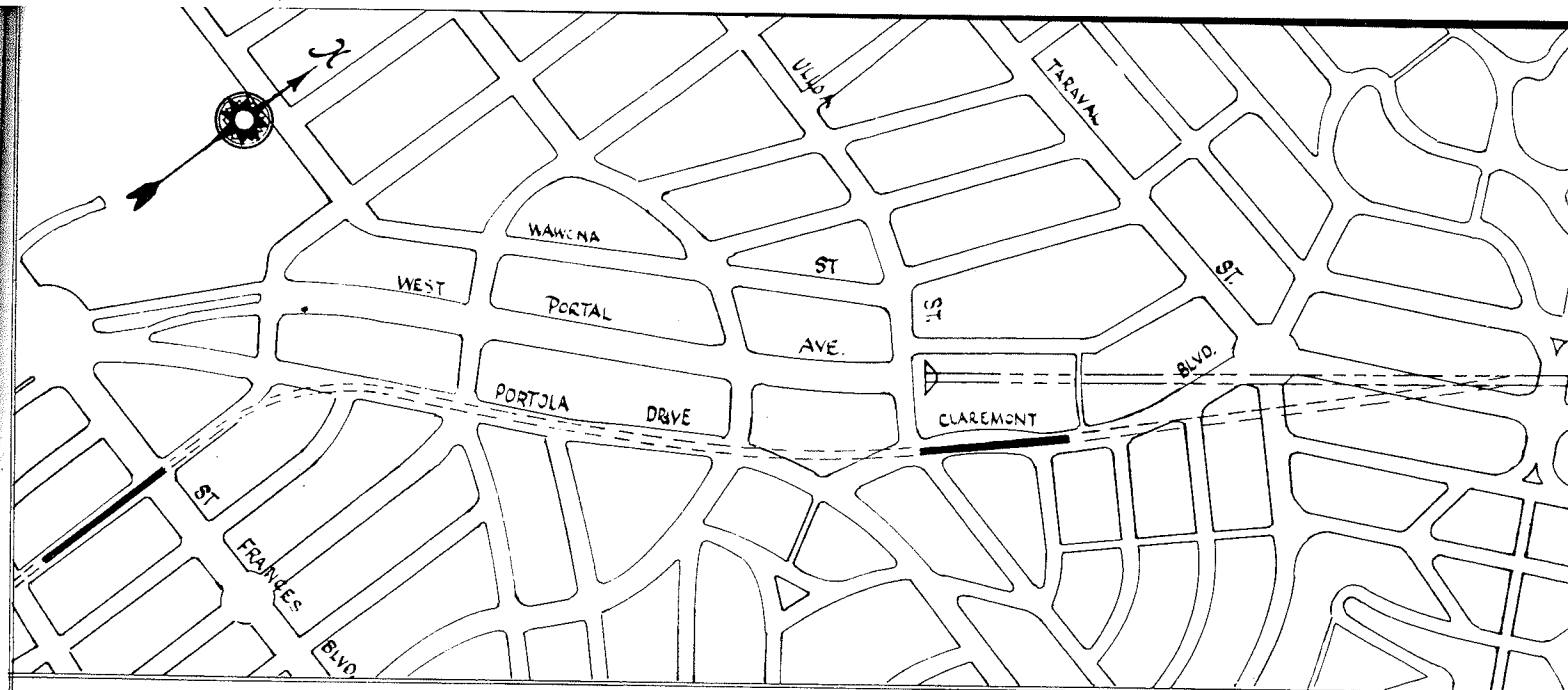
MARKET-TWIN
PEAKS LINE

Plan and Profile
EUREKA ST.
to
MONTGOMERY ST.

Scale 1" = 400'

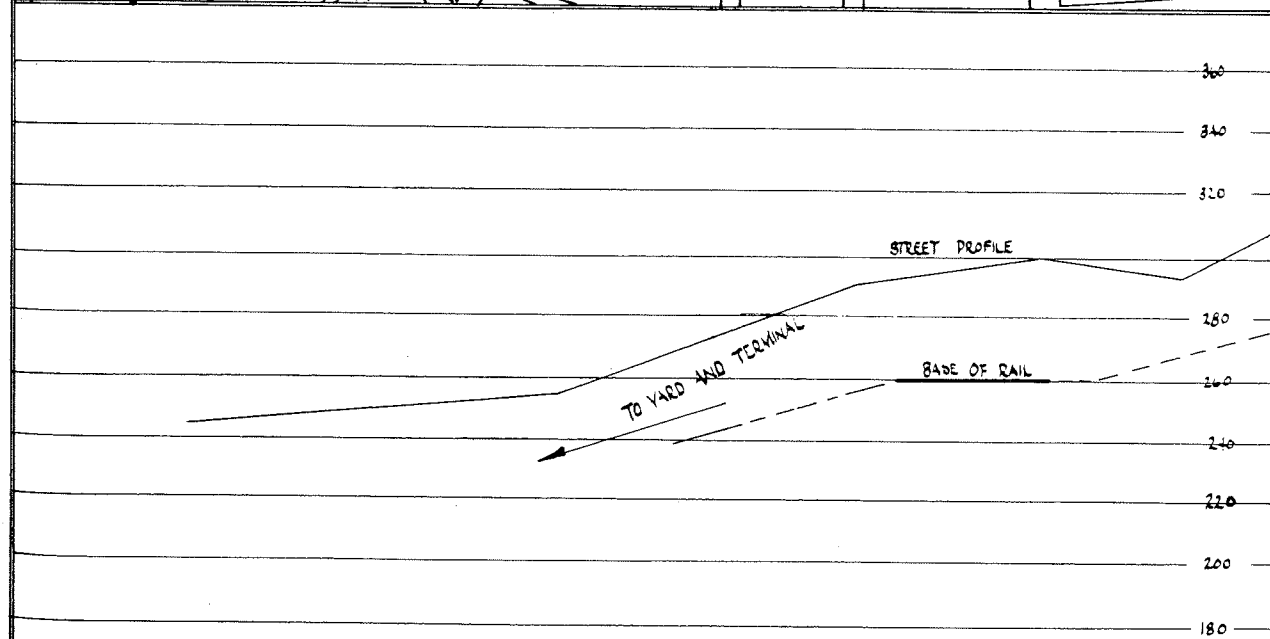
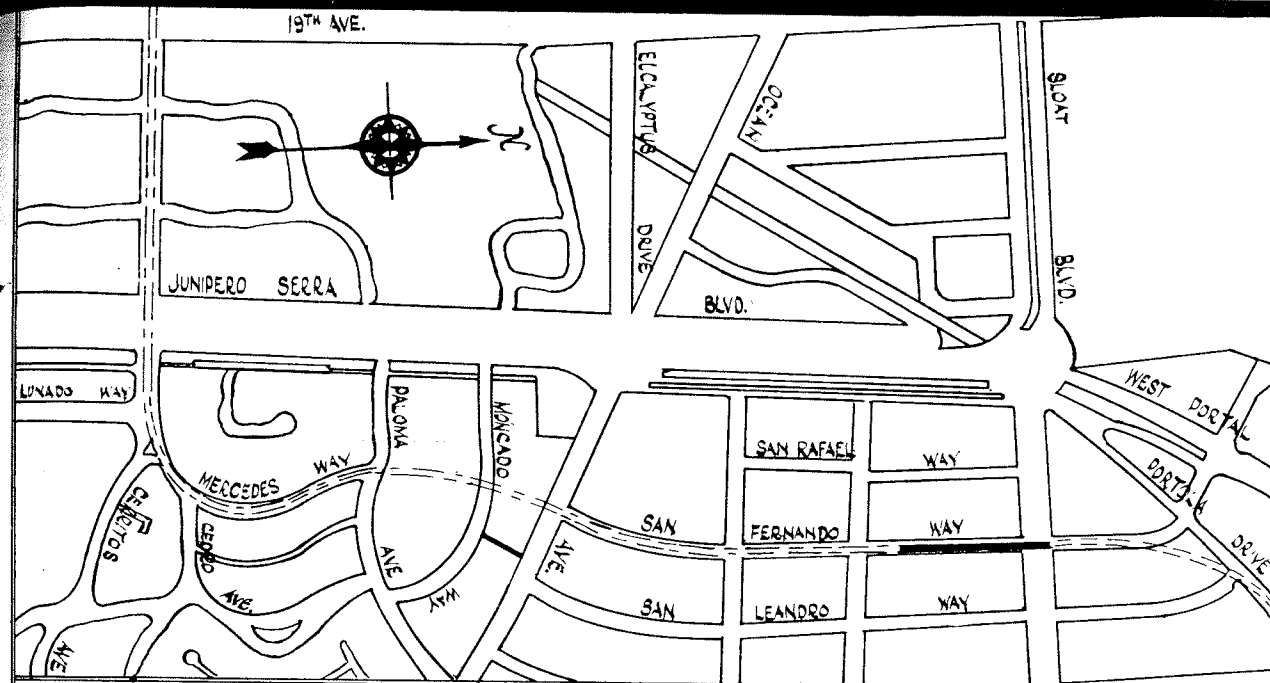


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MARKET-TWIN
PEAKS LINE
Plan and Profile
ST. FRANCIS BLVD.
to
TWIN PEAKS TUNNEL
Scale 1" = 400'

FEB. 1949



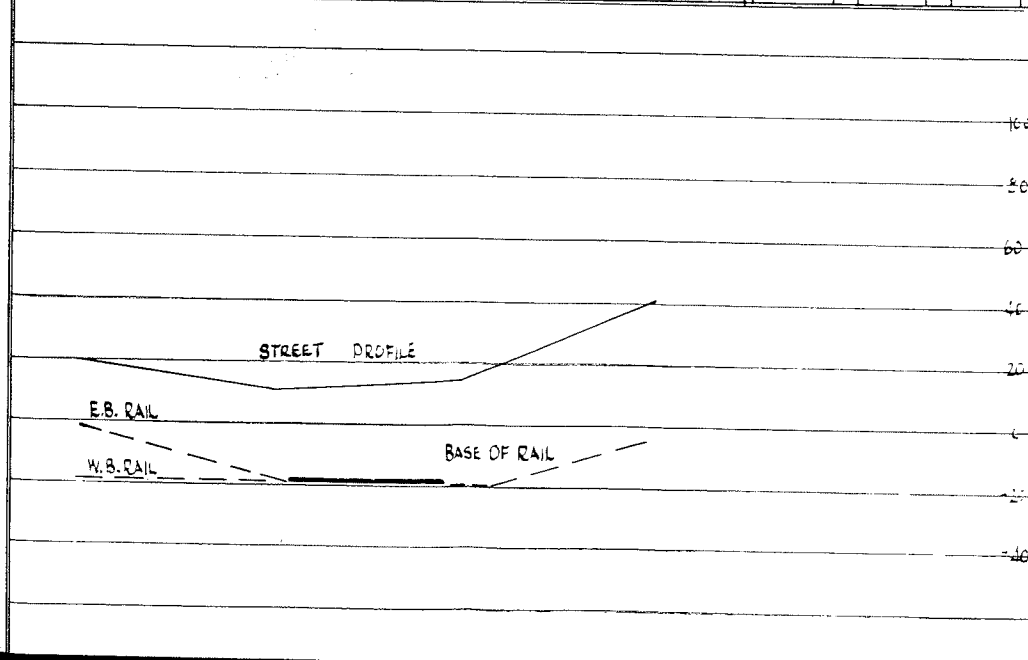
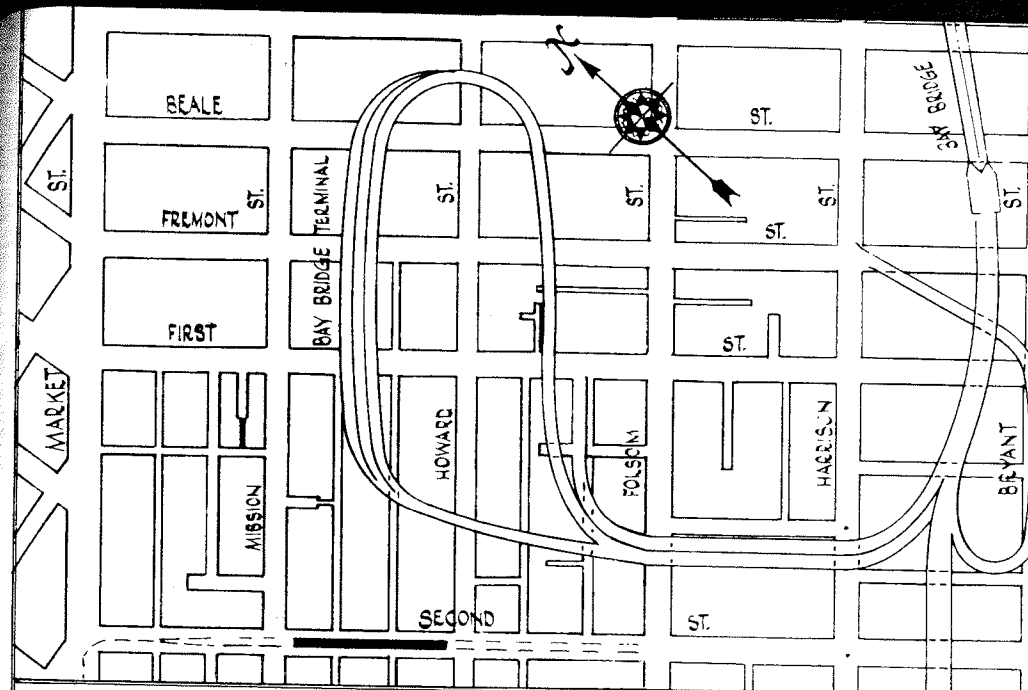
MARKET-TWIN PEAKS LINE

Plan and Profile

19th AVE. - PORTOLA DR.

Scale 1" = 400'

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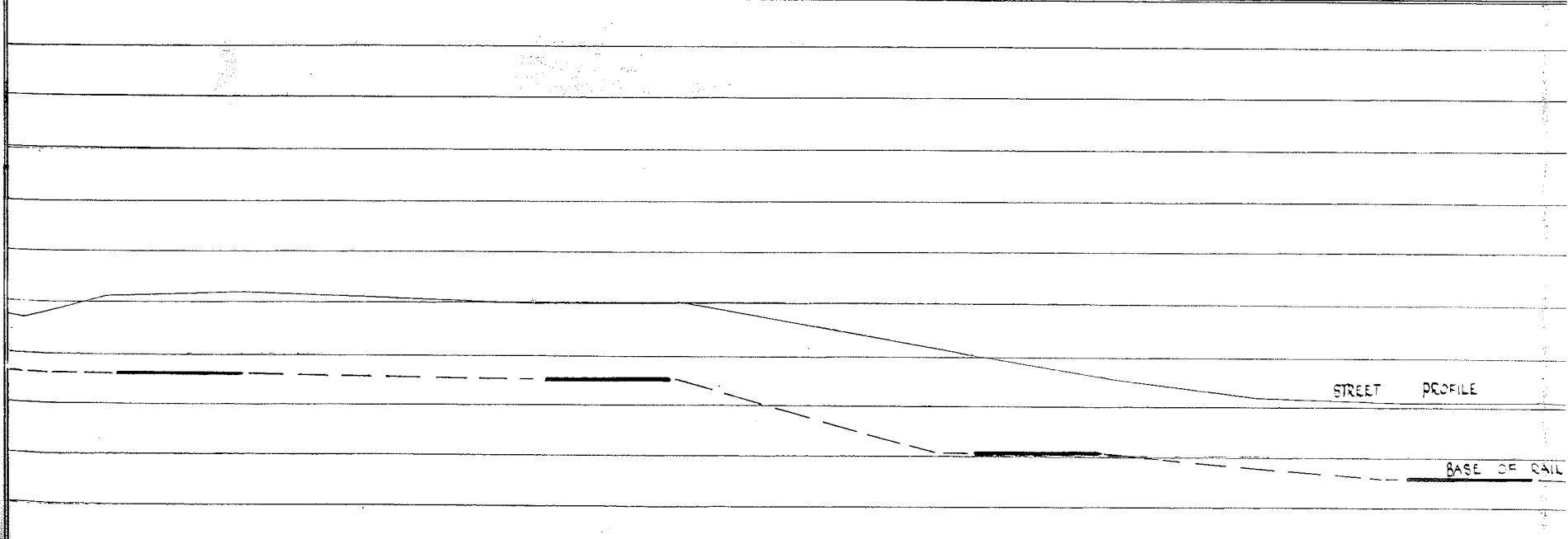
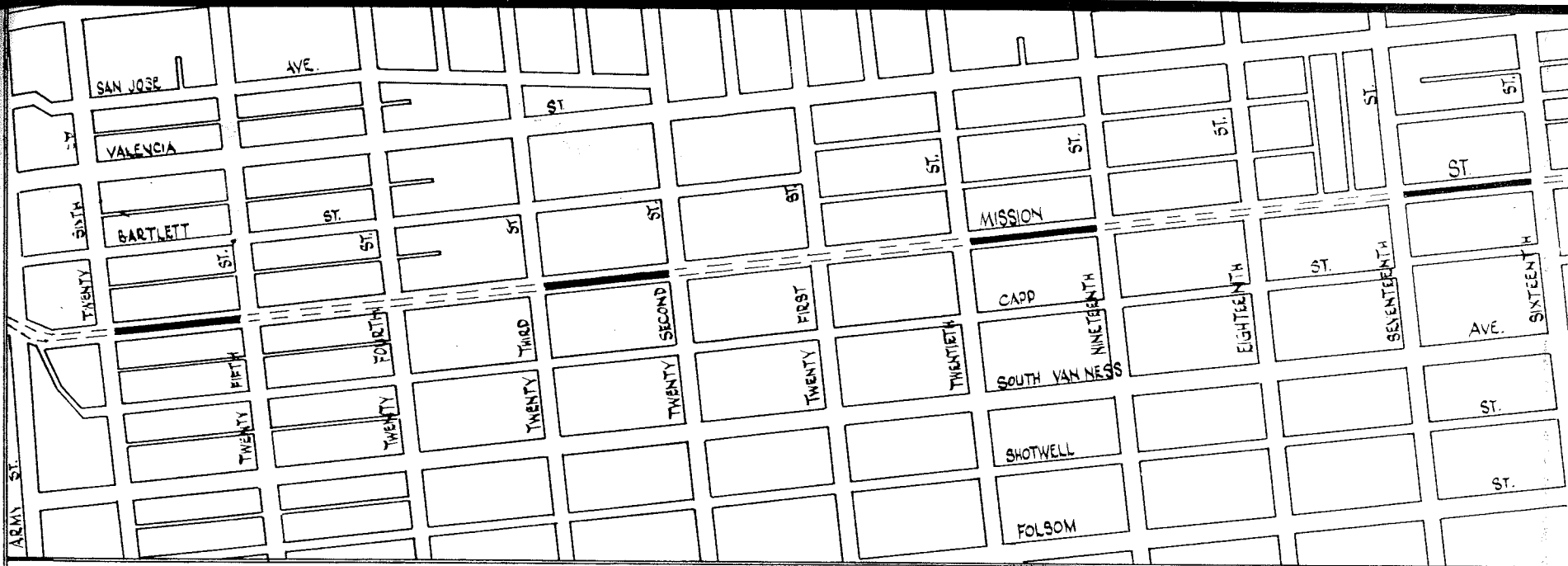
MARKET - MISSION LINE

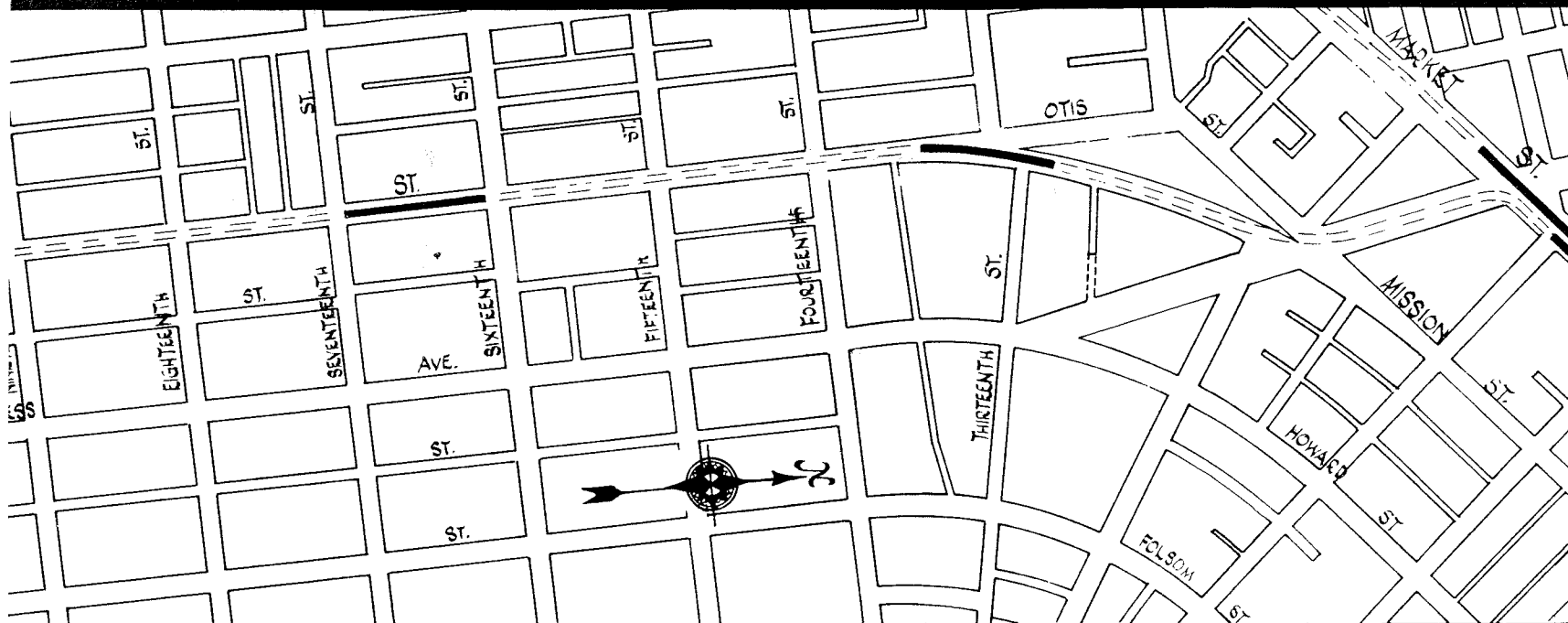
Plan and Profile

SECOND STREET

Scale 1" = 400'

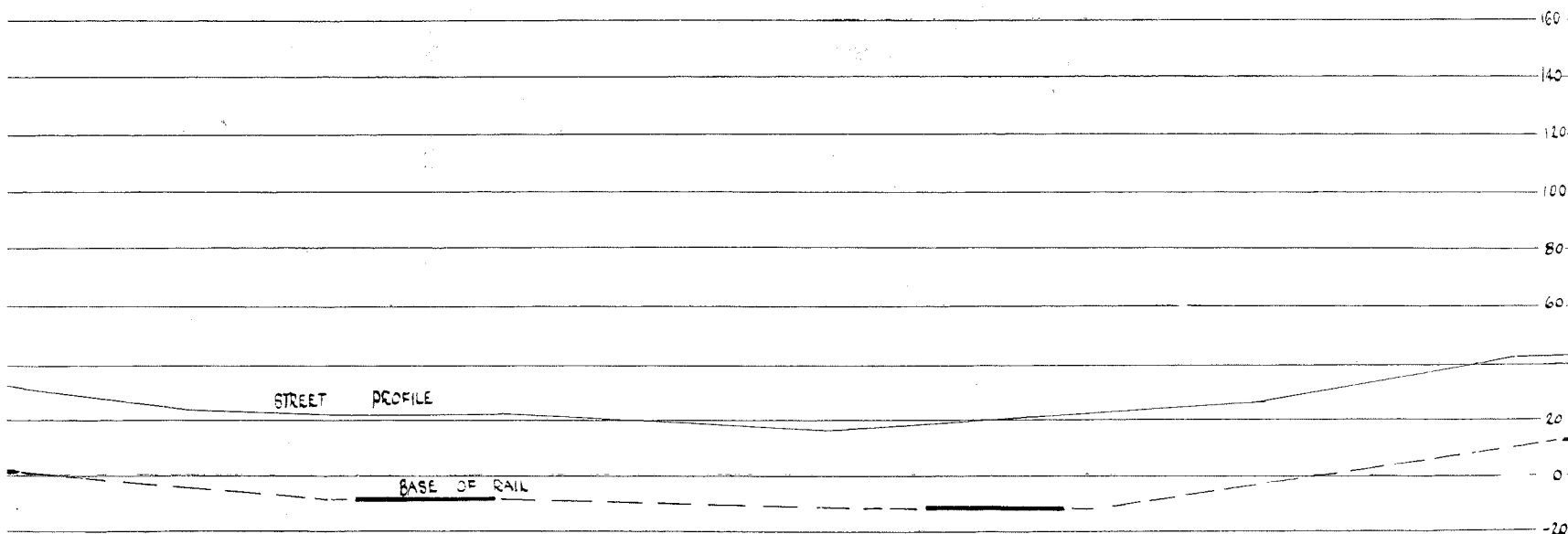
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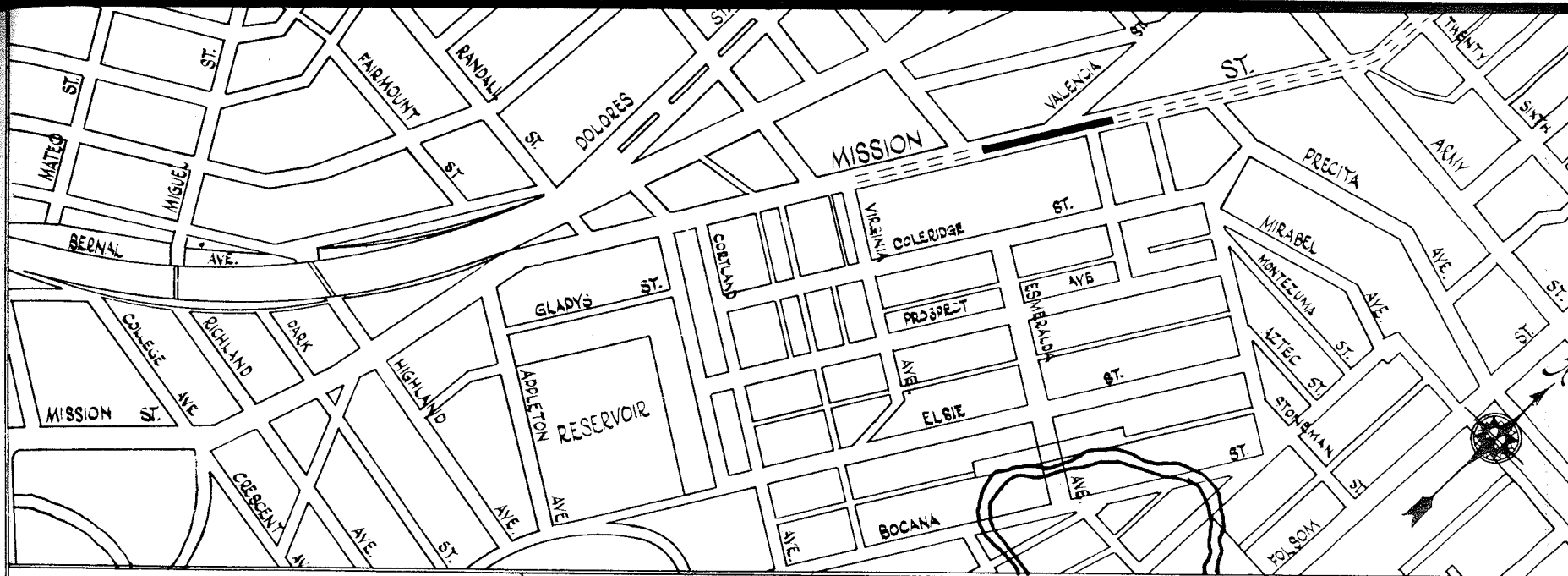


MARKET - MISSION LINE

Plan and Profile
 TWENTY FIFTH ST.
 to
 MARKET ST.
 Scale 1" = 400'

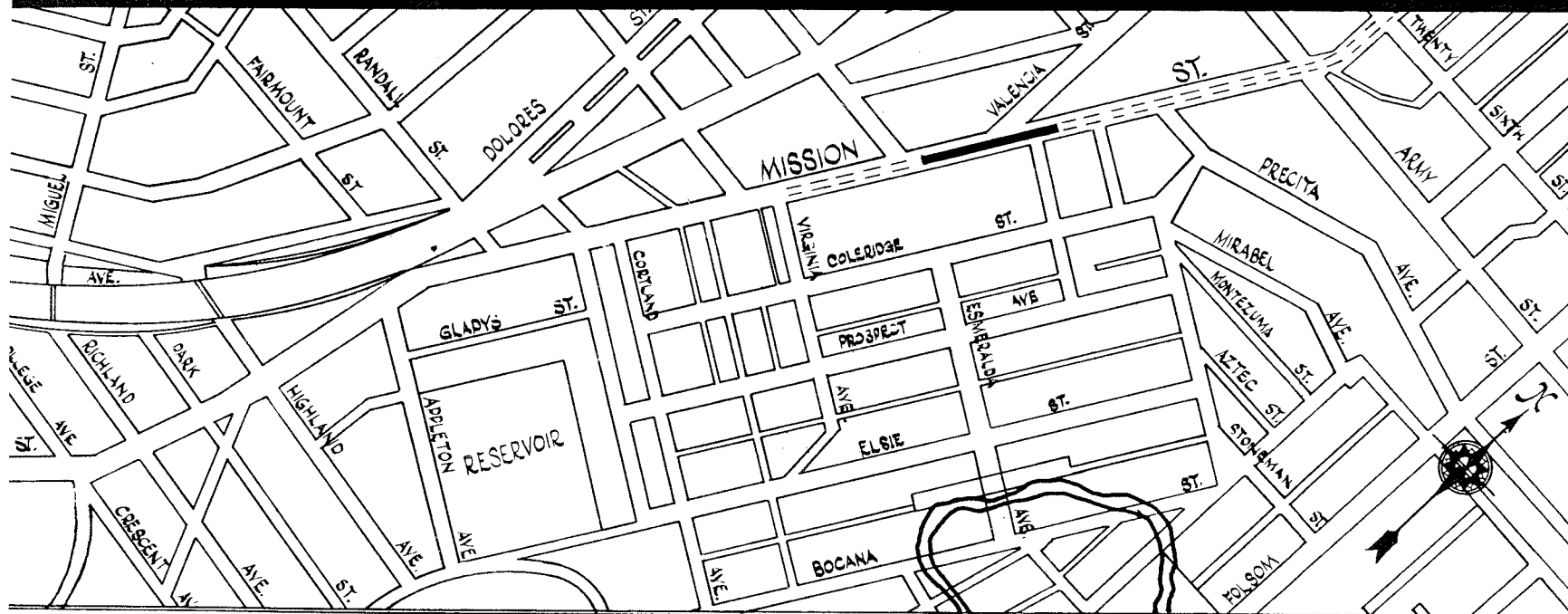


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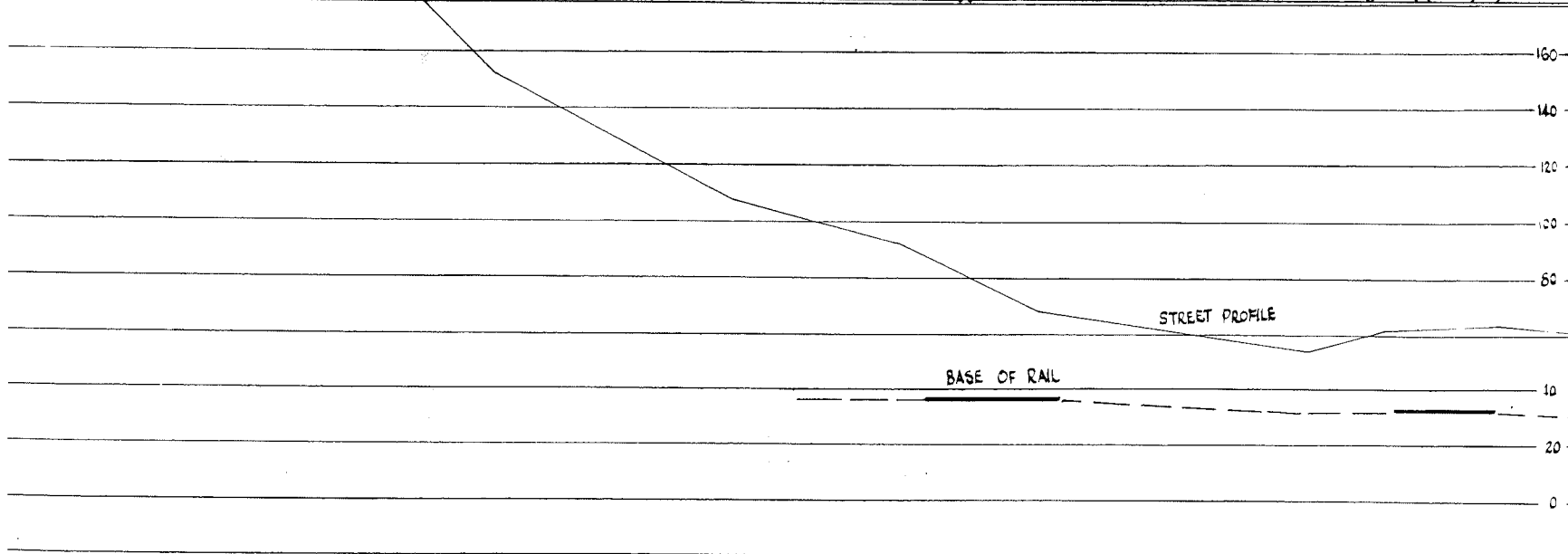
STREET PROFILE

BASE OF RAIL

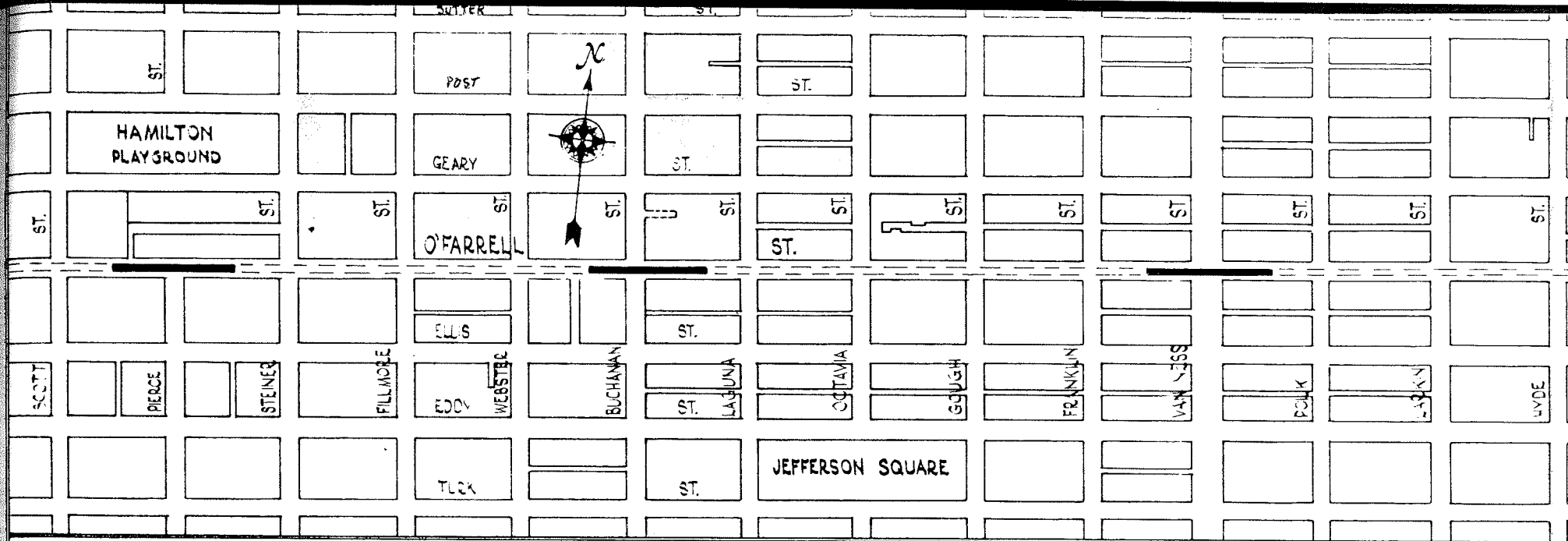


MARKET - MISSION LINE

Plan and Profile
VALENCIA STREET
to
TWENTY SIXTH ST.
Scale 1" = 400'



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SCOTT

PIERCE

STENER

FILLMORE

EDDY

WEBSTER

BUCHANAN

LAGUNA

OCTAVIA

GOUGH

FRANKLIN

VAN NESS

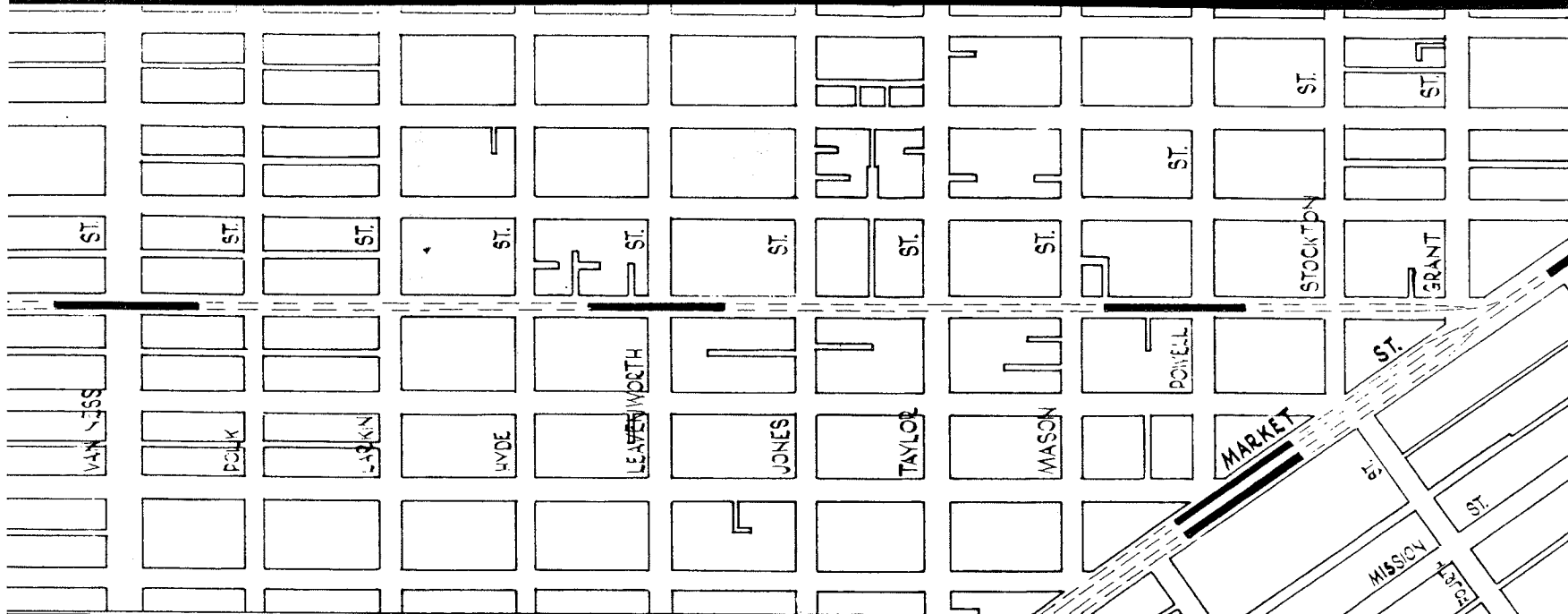
POLK

LYDE

HAMILTON
PLAYGROUND

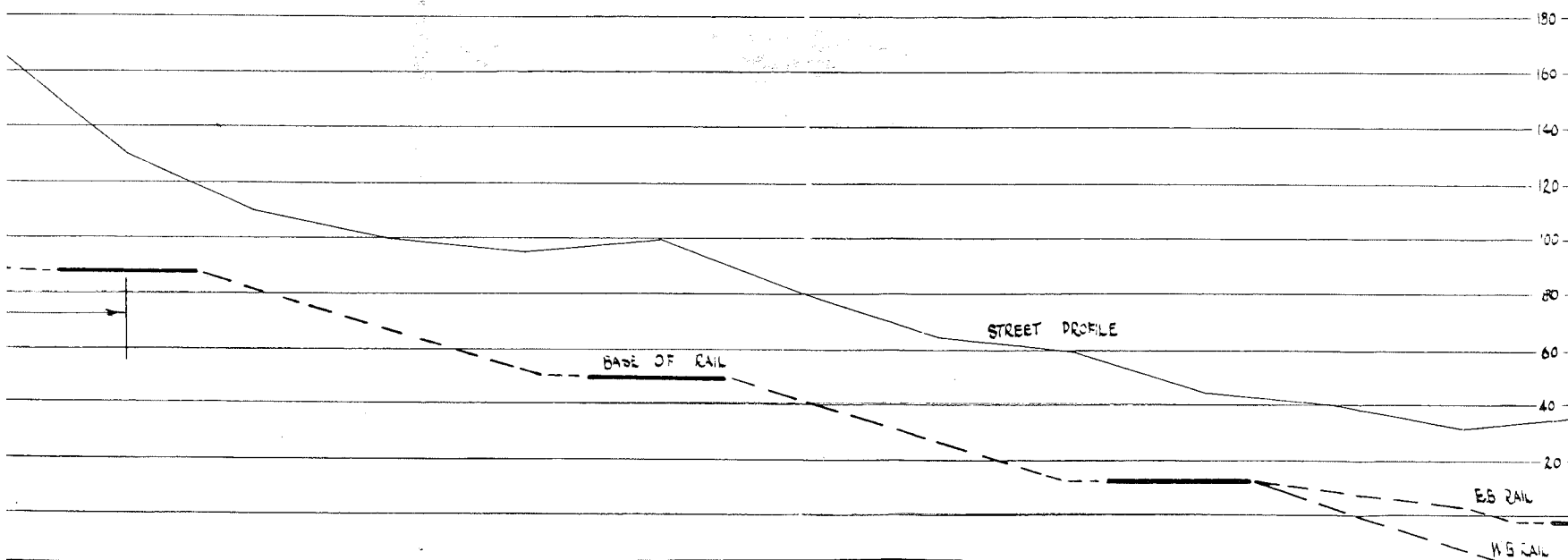
JEFFERSON SQUARE

TUNNEL

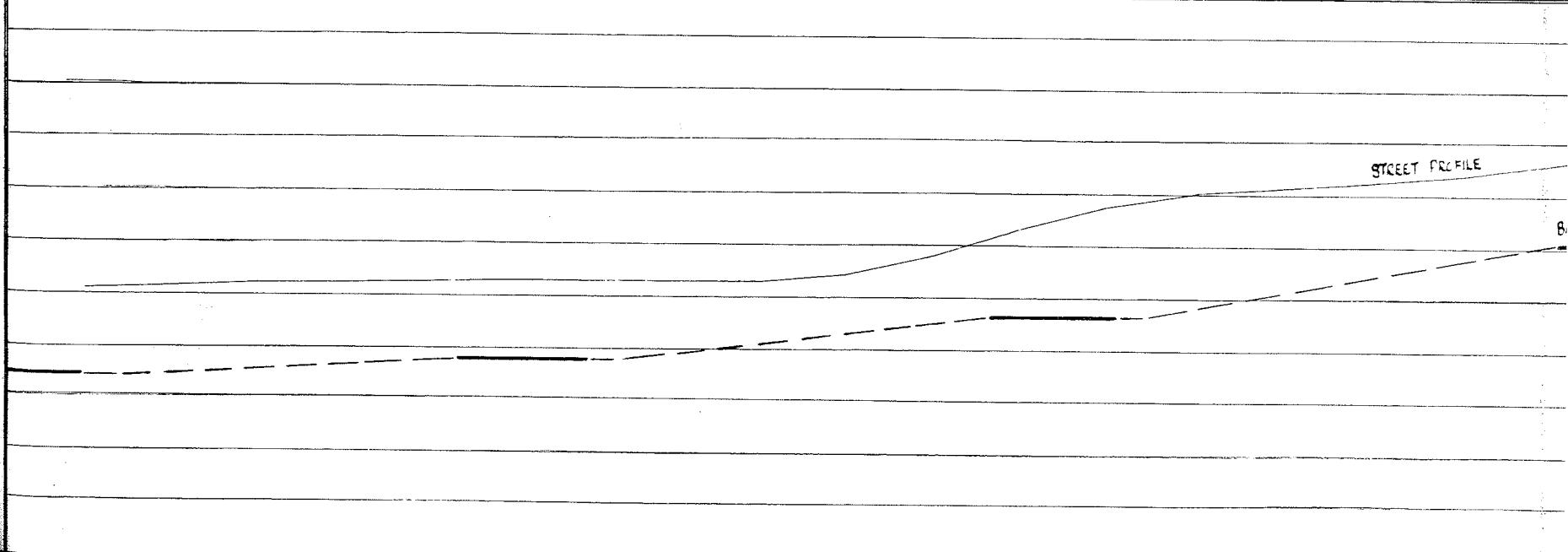
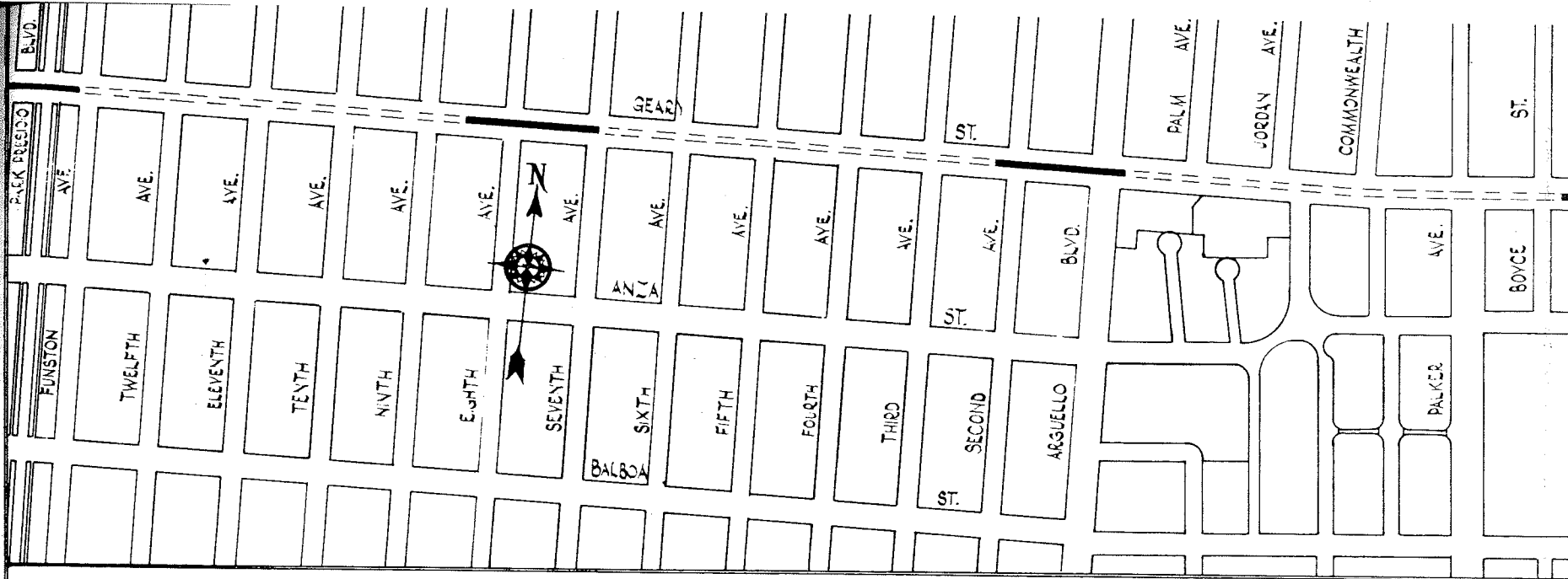


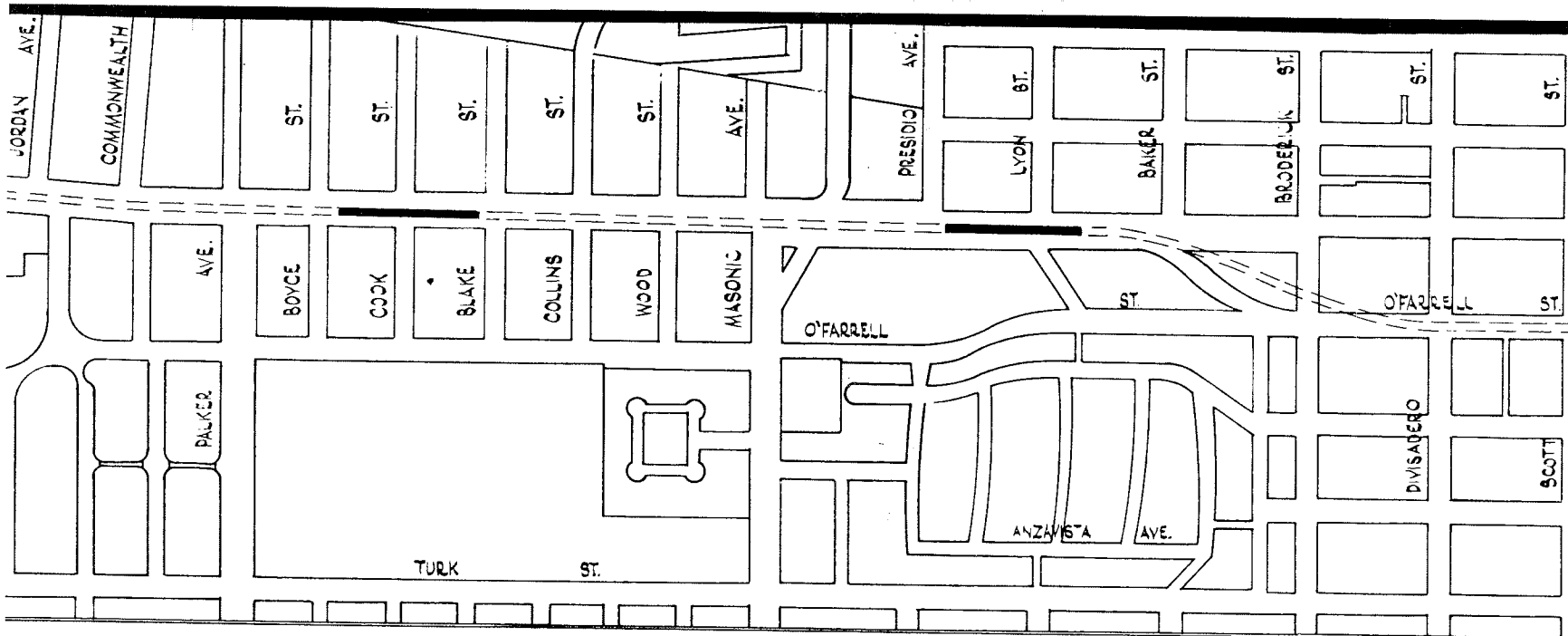
O'FARRELL-GEARY LINE

Plan and Profile
PIERCE STREET
to
MARKET ST.
Scale 1" = 400'



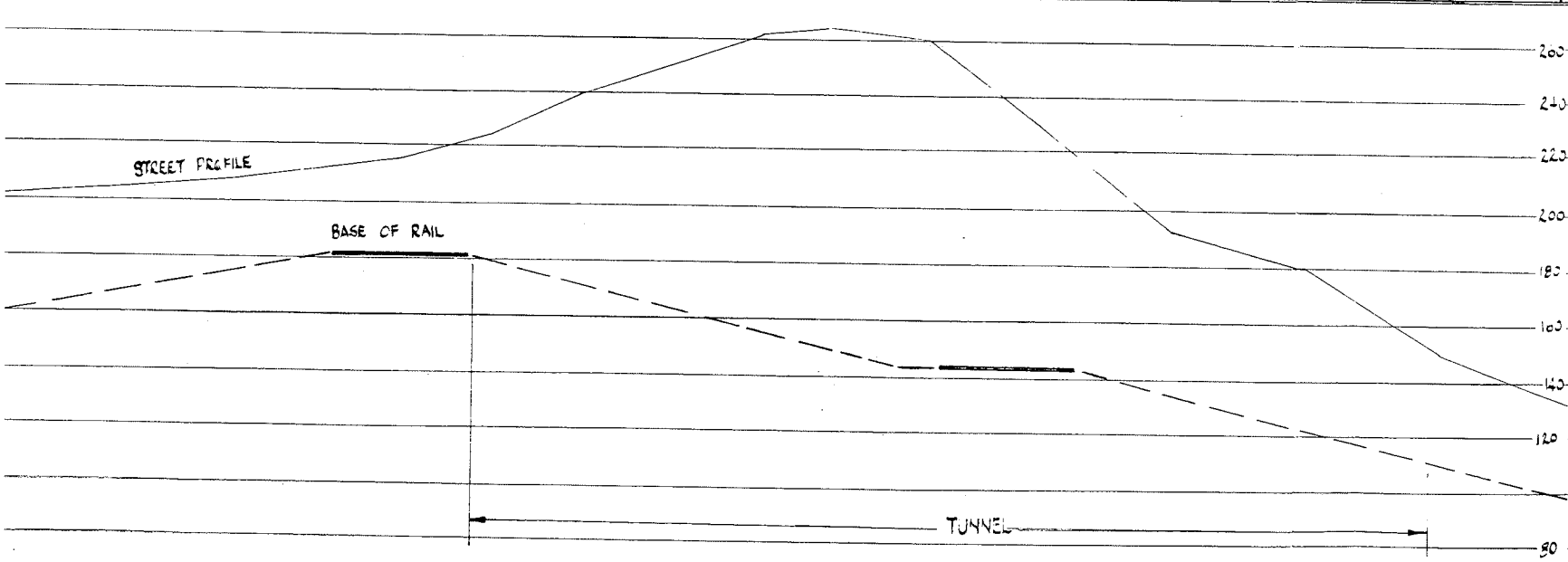
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O'FARRELL-GEARY LINE

Plan and Profile
PARK PRESIDIO BLVD.
to
SCOTT STREET
Scale 1" = 400'



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